Fast Corrector Power Supply Control for SPEAR

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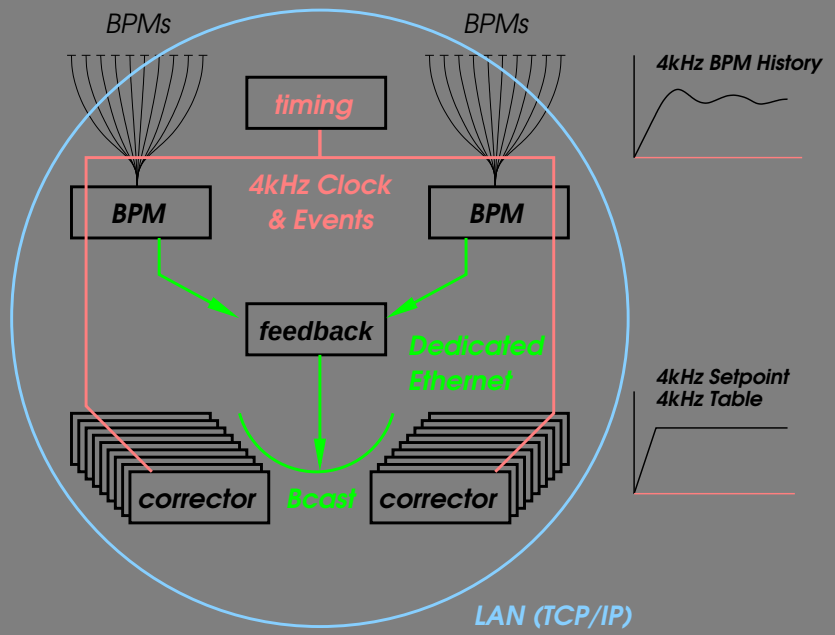
Overview

- System Performance Requirements
- MCOR 30 Hardware
- IOC Software Architecture
- Feature Summary
- Q ’n A

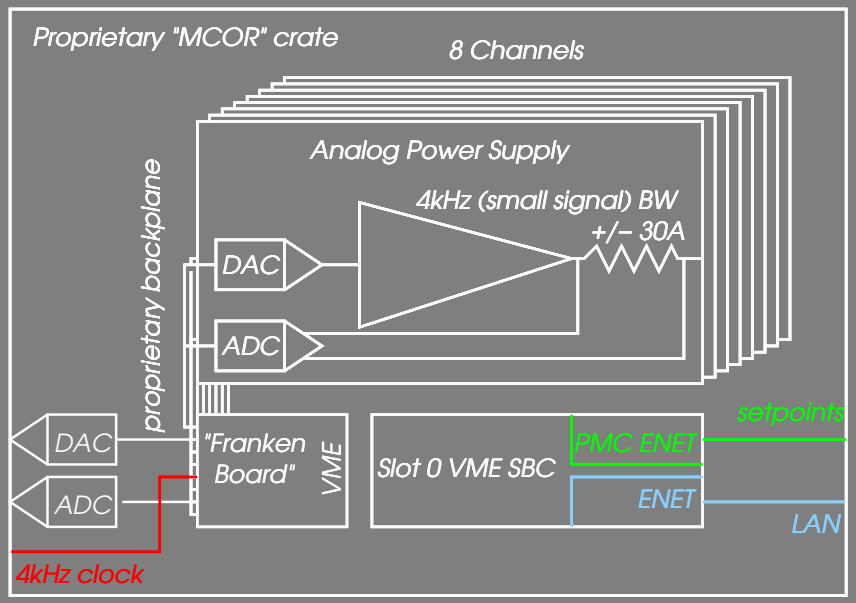
Spear Corrector Power Supplies

- 108 bipolar channels
- 8 channels/crate
- +/- 30A current / channel
- 1 "bulk" supply / crate
- Throughput: setpoint update @4kHz (small signal)
- 24 bit setpoint DAC resolution
- 3 24bit readback ADCs (currents, diff. load voltage)
- 16-bit calibration DAC
- EPICS Controls



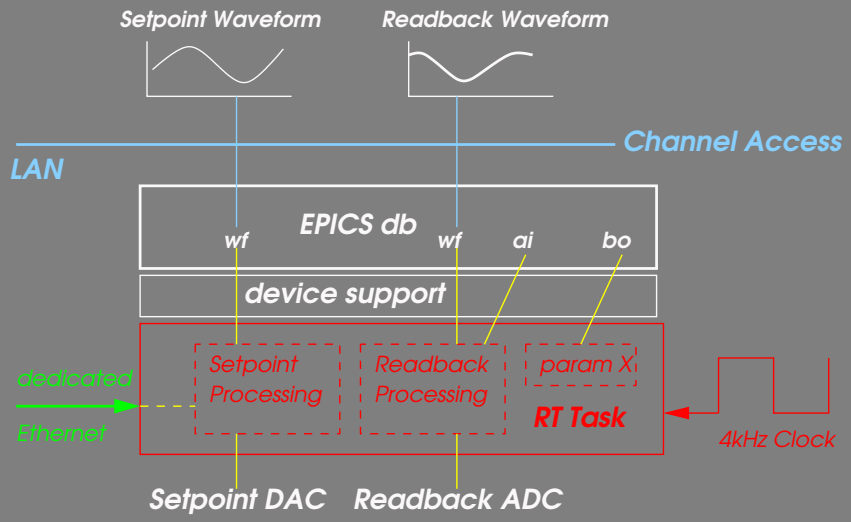
MCOR 30 Bipolar Power Supply Hardware

- Proprietary crate hosts 8 analog +/- 30A channels
- Piggyback setpoint DAC, readback ADCs
- Controlled by off-the shelf SBC
- "Franken(stein) board" bridges backplane to VME
- 2nd (dedicated) Ethernet (PMC) for fast setpoint transmission. Setpoint packets are broadcast to all PS crates.
- Analog backdoor



MCOR 30 Control Software

- 8 virtually independent channels
- 1 high priority RT task runs at 4kHz clock rate
  - drive setpoints either from waveform table orfrom dedicated ethernet link
  - store ADC readbacks (waveform)
  - scaling according to AI/AO conversion algorithm
  - run decimation filters for slow readbacks timestamp data
  - event triggered setpoint tables allow for synchronization of multiple crates
  - tag data with 4kHz timestamps
- Device support integrates PVs with RT layer. CA is used for I/O on LAN.
- Slow monitors & controls of non-RT critical data use EPICS directly.



Summary

- Analog PS
- High resolution DAC + readback ADCs
- Low res. calibration DAC
- 4kHz update rate
- Slow controls, setup, setpoint tables use EPICS
- 4kHz streamed setpoints over dedicated ethernet
- Synchronization to global 4kHz timestamp/clock